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Elachista dimorphella sp. nov., the first known sexually dimorphic species of Aphelosetia, a subgenus of *Elachista* (Elachistidae, Elachistinae)

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Abstract. *Elachista dimorphella* **sp. nov.**, the first known species with a sexually dimorphic wing pattern of the large subgenus *Aphelosetia* of the genus *Elachista* is described. The male is dark grey with an indistinct forewing pattern, the female yellowish white, variably with a yellow to honey-yellow pattern and some brown scales. The male and female were associated by their DNA barcodes that cluster together with nearly no variation within the cluster. Based on original type material or other material from the vicinity of the type locality, and/or barcode data, we also characterise previously unknown or misinterpreted species or sexes of close relatives of *E. dimorphella*: male of *E. amseli* Rebel, 1933, a species with unclear status; the previously unknown male of *E. constitella* Frey, 1859, and female of *E. maculata* Parenti, 1978. The male of *E. maculata* has widely but erroneously been considered to be *E. constitella*.

Introduction

Elachista Treitschke, 1833 (Elachistidae), is a large genus of Lepidoptera belonging to the superfamily Gelechioidea. The genus as currently defined comprises approximately 700 described, presently considered valid species (Kaila 2019; Kaila et al. 2025). It is among the largest lepidopteran genera, and many more species are known but awaiting description. *Elachista* was divided into four subgenera by Kaila (1999a) and a fifth was added by Kaila and Sugisima (2011). In this genus the wing colouration of males and females is usually uniform. Examples of species with sexual dimorphic wing pattern are found in the subgenera *Elachista*, especially in the *E. bifasciella* Treitschke, 1833 and *freyerella* (Hübner, 1825) species-groups (see e.g., Traugott-Olsen and Nielsen 1977, [the *E. freyerella* group as the genus *Cosmiotes* Clemens, 1860]; Kaila 1999b, 2011). Even more striking sexual dimorphism is known in some groups of Australian representatives of the subgenus *Atachia* Wocke, 1876 (Kaila 2011). Otherwise, sexual wing pattern difference has been unknown in *Elachista*.

One of the subgenera of *Elachista* is *Aphelosetia* Stephens, 1834 (type species *Phalaena argentella* Clerck, 1759) that has been further divided into three informal species groups: *argentella*, *bedellella* and *dispilella* groups, as defined by Kaila (1997, 2007), Kaila et al. (2015). In this paper we report the first sexually dimorphic species of this subgenus. It belongs to the *E. bedellella* group.

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This species group is confined to the Palaearctic region, with most known species in temperate regions. It currently contains about 50 named species (Kaila 2019; Kaila et al. 2025), and many undescribed ones.

Material and methods

Specimens of the new species were taken as adults, collected with a net or attracted to light-traps. The genitalia were dissected following the usual procedure for small Lepidoptera and embedded in Euparal in glass slides or stored in small plastic vials filled with glycerol. To stain the male genitalia, an aqueous solution of red (yellow) eosin was used. The abdominal pelt of male specimens, and both the abdominal pelt and the genitalia of female specimens were gently stained using chlorazol black E in a solution of water and ethylene alcohol. The terminology of wing pattern and morphology follows the standard work of Traugott-Olsen and Nielsen (1977), with some modifications by Kaila (1997, 1999a) and Kaila and Sugisima (2011). Photographs of adults were taken using an Olympus camera with an Olympus M. Zuiko Digital ED, 60 mm f/2.8 MACRO lens and Olympus Capture software. Final image editing was performed with CorelPHOTO-PAINT, included in CorelDRAW Graphics suite 2022–2024. Photographs of the genitalia were taken with a Leica DM4000 LED microscope and an integrated Leica MZ170 HD camera, and were edited, and the plates of each specimen assembled using several versions of the CorelPHOTO-PAINT program, included in the CorelDRAW Graphics suite 2022–2024. All these photographs were taken and edited by the first author. In addition, the photograph of the type locality was taken using the digital camera Konica Minolta DiMAGE Z5 and the drawings of male genitalia using Indian ink on transparent drawing paper were made by the second author. Comparison of the length of the phallus in relation to the valva was measured as the longest line from the base of the sacculus to the apex of the cucullus. In the assembled male genital plates of each specimen the true length of the phallus as compared with other parts of the genitalia is shown with the phallus positioned in the left side of the genitalia. The images do not reflect their relative size among the species. As the size of the genitalia closely correlates with the size of the specimen, the wingspan can be used as a proxy for the relative sizes of the genitalia.

The specimens are preserved in the scientific collections of Zdenko Tokár, Ľubomír Srnka, Ján Liška and Kai Berggren, MZH and TLMF.

Molecular analysis

Tissue samples (dry legs) from the study specimens were successfully processed at the Canadian Centre for DNA Barcoding (CCDB; University of Guelph) using standard protocols. These sequences, along with details of the sequenced specimens, were uploaded to the Barcode of Life Data Systems (BOLD; Ratnasingham and Hebert 2013) and to the project ELACA Elachistinae of the World (https://v4.boldsystems.org/index.php/MAS_Management_DataConsole?codes=ELACA) managed by Marko Mutanen. We compared the sequences initially with all records accessible to us and then selected a representative of each species and BINs (Barcode Index Numbers) of the *Elachista bedellella* species group for further analyses. We also added three specimens from other datasets that formed the same BIN. A Maximum Likelihood tree was constructed under the GTR model for nucleotide substitution, with node bootstrap support values based on 500 pseudoreplicates. The tree was rooted to *E. vulcana* Kaila, 2011. Mega X (Kumar et al. 2018) and FigTree (Rambaut 2012) programs were used to generate and edit the tree.

Abbreviations

MZH Finnish Museum of Natural History, Finland
NHMUK Natural History Museum, London, United Kingdom
NHMW Naturhistorisches Museum Wien, Vienna, Austria
SMNK Staatliche Museum für Naturkunde Karlsruhe, Germany
TLMF Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria
ZSM Zoologische Staatssammlung München, Germany

Taxonomy

Elachista dimorphella Kaila & Tokár, sp. nov.

https://zoobank.org/AD71B8CB-9B7B-4CF6-BE85-FB588320DF27

Figs 1–6, 13, 14, 21, 24

Material examined. Holotype. ♀, • **Croatia**, Zaostrog - Kosovići, Rilić Mts, 300 m (43.0922°N, 17.1726°E), 26.vi.2006, DNA sample 22169 Lepid. Phyl., leg. Z. Tokár, in Coll. Tokár.

Paratypes. • **Croatia**, Istria, Pula, 30 m (45.5041°N, 13.5017°E), 14.–19.v.1990, 5 ♂, Z. Tokár prep. 321, L. Kaila prep. 4420, DNA sample 16946 Lepid. Phyl. [unsuccessful], leg. Z. Tokár, in Coll. Tokár, J. Liška & MZH; • Zaostrog, 180 m (43.0860°N, 17.1750°E), 8.vii.2004, 1 ♂, Z. Tokár prep. 14955, 1 ♀, leg. Z Tokár, in Coll. Tokár; the same locality, 9.vii.2004, 4 ♂, Z. Tokár prep. 8833, 14675, L. Kaila prep. 4421, DNA sample 16947 Lepid. Phyl., 7 ♀, Z. Tokár prep. 8711, 8883, 10842, 14972, 14972, 14973, 14974, DNA sample 19978 Lepid. Phyl., leg. Z. Tokár, in Coll. Tokár & MZH; the same locality, 8.–9.vii.2004, 1 ♀, L. Kaila prep. 4422, DNA sample 21353 Lepid. Phyl., leg. Ľ. Srnka, in Coll. Ľ. Srnka; • Zaostrog - Kosovići, Rilić Mts, 300 m (43.0922°N, 17.1726°E), 26.vi.2006, 12 ♂, Z. Tokár prep. 14969, 1470, 14971, 2 ♀, Z. Tokár prep. 10843, 14673, leg. Z. Tokár, in Coll. Tokár; • Bilišane, 300 m (44.1029°N, 15.4608°E), 30.vi.2006, 1 ♂, DNA sample 22167, leg. Z. Tokár, in Coll. Tokár; • Istria, Rovinj, Kokuletovica, 50 m (45.0546°N, 13.7198°E), 3.v.2016, 1 ♂, TLMF_Lep_24106, leg. H. Deutsch, in Coll. TLMF; • Zadar County, Zaton Obrovački, 16.vi.2019, 152 m (44.25°N, 15.681°E), 1 ♀, KBE_2019301, leg. K. Berggren, in Coll. Berggren.

Italy: • Prov. Veneto, VE Caorle, küste [coast], 1–4 m, (45.59°N, 12.87°E), 7.vi.2012, 1 ♀, DNA sample 25469 Lepid. Phyl., leg. T. Meyr, in Coll. MZH.

Slovenia: • Petrinjski kras near Petrinje, 450 m (45.3357°N, 13.5424°E), 3.vi.2005, 1 ♂, Z. Tokár prep. 8997, DNA sample 22609 Lepid. Phyl., 1 ♀, Z. Tokár prep. 8994, L. Kaila prep. 5474, DNA sample 21400 Lepid. Phyl., leg. Z. Tokár, in Coll. Tokár; • Primorska, Brestovica, 5.vi.2013, 60 m (45.8122°N, 13.6191°E), 1 ♀, TLMF_Lep_24096, leg. H. Deutsch, in Coll. TLMF.

Description. Female adult (Figs 1–3). Wingspan 7.5–8.5 mm. Labial palpus upcurved, third segment approximately the same length as second segment, yellowish white. Head, neck tuft, tegula, and scape of antenna yellowish white. Flagellum thick, white, ringed brown. Legs yellowish grey. Forewing ground colour yellowish white, variably with yellow to honey-yellow pattern and sparsely scattered, light brown scales, especially along the apex of the fringe on the termen. Fringe scales concolorous with forewing ground colour. Hindwing yellowish grey, fringe slightly lighter. Underside of forewing more densely dusted with brown.

Male adult (Figs 4–6). Wingspan 6.5–7.7 mm. Labial palpus upcurved, as long as diameter of head, off-white, somewhat fuscous below. Head, neck tuft, tegula, thorax, scape and pedicel of antenna unicolorous grey or intermixed with paler scales. Flagellum thick, unicolorous grey.

Figures 1–6. Adults of *Elachista dimorphella* sp. nov. **1.** Female, holotype, Croatia, Zaostrog - Kosovići, Rilić Mts, 26.vi.2006, MM22169; **2.** Female, paratype, Croatia, Zaostrog, 8.–9.vii.2004, LK4422; **3.** Female, paratype, Italy, Caorle, 7.vi.2012; **4.** Male, paratype, Croatia, Bilišane, 30.vi.2006; **5.** Male, paratype, Croatia, Zaostrog, 9.vii.2004, LK4421; **6.** Male, paratype, Croatia, Pula, 14.–19.v.1990, LK4420. Scale bars: 2 mm.

Legs ochreous grey. Forewing ground colour grey, variably with faint, irregular pattern formed of darker grey scales. Fringe scales concolorous with forewing ground colour. Hindwing dark grey with concolorous fringe. Underside of wings dark grey, with concolorous fringe.

Female genitalia (Figs 21, 24). Papilla analis membranous, somewhat tapered towards nearly round apex; ventrally connected with inverted Y-shaped sclerotisation. Apophysis posterioris straight, as long as the basally curved apophysis anterioris. Ostium bursae round, dorsal wall without sclerotisation or spines. Antrum and colliculum indistinguishable, together 2/3 as long as apophysis posterioris. Remaining part of ductus bursae approximately 3× as long as apophyses, membranous, without internal spines. Ductus bursae not distinctly separable from corpus bursae. Corpus bursae oval, with two rows of small internal spines.

Male genitalia (Figs 13, 14). Uncus lobe nearly twice as long as broad at its broadest point, evenly tapered towards pointed apex, with few short setae distolaterally, incision separating uncus lobes 1/4 of length of uncus. Spinose knob of gnathos oval, twice as long as broad. Valva 3× as long as broad at its broadest point in the middle; costa basally straight, distinctly convex in distal third; sacculus broad basally, straight beyond middle; cucullus weakly bent towards costa. Digitate process small, about 1/7× as long as of valva, distally dilated, blunt and setose, ventral margin weakly convex. Juxta lobes basally widely separated from each other, round; their median margin convex, lateral margin concave; distal margin with a few short setae; median plate with shallow dorsally directed median sac. Vinculum with minute saccus. Phallus 0.6–0.75× as long as valva, straight, 4.5× as long as broad at its broadest point at distal 2/3. No cornuti present.

Female diagnosis. The female's forewing is yellowish-white with yellow to honey-yellow pattern, and to a varying extent sparsely scattered with brown scales, especially along the apex of the fringe on the termen. It is externally not easy to associate with the closest relatives of the *E. bedellella* group, but can rather be mixed with almost any *Elachista* species with a yellowish-white to yellow forewing colour. Among species of the *E. bedellella* group it is externally similar to species such as *E. slivenica* Kaila, 2007, *E. ohridella* Parenti, 2001, and *E. mariae* Kosorín & Tokár, 2024. The genitalia, however, have characters that differentiate all these species. In the *E. argentella* group, a complete revision of the complex of variably yellow species in the *E. cingillella* subgroup is not available (Kaila and Junnilainen 2002), where at least *E. subalbidella* Schläger, 1847 and *E. laetella* Rebel, 1930 of the named species are externally similar to the unicolorous yellowish-white specimens of *E. dimorphella*. The female genitalia of *E. dimorphella* are characterised by a paired band of small spines in the corpus bursae, while the yellow representatives of the *E. cingillella* species group have a pair of small signa. Similar spine bands as in *E. dimorphella* are also present in *E. constitella* (Figs 22, 25), and *E. maculata* (Figs 23, 26). In *E. constitella* there are three or four, indistinctly fused rows. In *E. maculata* there are two elongate areas of coarse spines.

These species are also differentiated by the narrower ostium bursae in *E. dimorphella* (Fig. 21) and its unmarked ductus bursae, which is granulose in *E. constitella* (Fig. 22) and *E. maculata* (Fig. 23). The ductus bursae and the corpus bursae are fused without a distinct division, but clearly identifiable in *E. constitella* and *E. maculata.* In the subgenus *Elachista* there are several externally more or less similar species, and their separation from species of subgenus *Apheloseti*a on the female genitalia is easiest to recognise by the presence of a Y-shaped sclerotisation on the ventral side between the papillae anales in species of *Apheloseti*a, unlike in the subgenera *Atachia* and *Elachista.*

Male diagnosis. The male is externally similar to several other darker species, or putative species, that are related to *E. atrisquamosa* Staudinger, 1880. The identity of *E. atrisquamosa*, described from "Kleinasien, Karasdere" [Türkiye, Amasya, Kara Dere], itself is still uncertain due to the absence of recent material that could with certainty be associated with this species, and due to the existence of several similar species or taxa with quite divergent barcode BINs resembling the illustrations of the holotype of *E. atrisquamosa* (see Nielsen and Traugott-Olsen 1978) from the Balkan Peninsula and Western Türkiye. The most striking characteristics of the male *E. dimorphella* from all other related taxa are the broad forewing shape, and the thick and unicolorous grey flagellum of the antennae. The wing pattern of the male is rather weak

and irregular. The male genitalia are distinguished from most described, related, species by the relatively long tapered uncus lobes. Perhaps the most similar male genitalia are in *E. vegliae* Parenti, 1978 (Fig. 20), which also possess a broad phallus. Its juxta lobes are, however, medially more produced, and the apex of the phallus is somewhat bent, unlike in *E. dimorphella* (Figs 13, 14). Externally, males of these species can be differentiated by the flagellum of the antenna which is unicolorous grey and thick in *E. dimorphella*, narrower and clearly annulated with pale rings in *E. vegliae*. *E. vegliae* is also generally paler (Parenti 1978). The female of *E. vegliae* is unknown. Similar but even more pronounced elongate and tapered uncus lobes are found in *E. ohridella*, *E. mariae*, *E. laurikailai* Varenne & Nel, 2020 (Fig. 18), and *E. nolckeni* Šulcs, 1992 (see also Baran 2002; Kosorín and Tokár 2024; Kaila et al. 2025). The forewing ground colour of all these species is more or less yellowish also in the male (though in *E. laurikailai* it has some pale grey suffusion), their wing shape is narrower, and the flagellum of the antenna is narrower in these species as compared with *E. dimorphella*. It should be mentioned that the specimen that Traugott-Olsen (1990) stated to be the previously unknown male of *E. constitella* is misidentified and represents *E. maculata*. We give below illustrations of the holotype of *E. maculata*, and a diagnosis of the male of the probably true *E. constitella*.

Distribution. *Elachista dimorphella* sp. nov. is currently known from a small number of localities near the Adriatic Sea: Italy – Region of Veneto, Caorle, Slovenia – Petrinjski kras, Brestovica, Croatia – Istria, Pula, Rovinj; Dalmatia, Bilišane, Zadar County; Zaton Obrovački, Zaostrog. The distribution has been recorded from near sea level to approximately 450 m (Petrinjski kras). The locality near Zaostrog is shown in Fig. 27.

Biology. The immature stages and the host plants are unknown. Adults were collected from early May to early July, mostly in light-traps. Some of them were disturbed from the low undergrowth before sunset (in Pula).

Etymology. The specific name *dimorphella* is derived from the strikingly different external appearance of males and females.

Molecular data (Fig. 28). The DNA barcoded specimens form a unique BIN: BOLD:ABA4184. Eleven specimens of the new species have been successfully sequenced, here only given with samples ID (MM22609, MM22169, MM21353, MM16947, MM19978, MM22167, MM21400, MM25469, TLMF_Lep_24096, TLMF_Lep_24106, KBE_2019301). Details regarding the collecting site and sequences are given above in the text. Additional data are accessible via the public dataset DS-ELADIM New dimorphic *Elachista* species (https://bench.boldsystems.org/index.php/MAS_Management_DataConsole?codes=DS-ELADIM).

Diagnoses of related species

Elachista amseli Rebel, 1933

Figs 7, 8, 15

Elachista amseli Rebel, 1933: 81

External appearance (Figs 7, 8, here translation from Gaedike 1975). Head, palpi, and thorax uniformly light, almost white. Forewing with white background with light brown spots. The entire basal third almost uniformly covered by brown-grey scales. Further light brown areas found along

Figures 7–12. Adults of *Elachista*. **7, 8.** *E. amseli*, **7.** male, paralectotype, Croatia, Dubrovnik, 15.–30.ix.1930, Coll. SMNK; **8.** female, paralectotype, Croatia, Dubrovnik, 15.–30.ix.1930, Coll. SMNK; **9**, **10.** *E. constitella*. **9.** Female, Italy, Trieste, 1.v.1910, LK5752, Coll. ZSM; **10.** Male, Italy, Trieste, 1.v.1910, LK5751, Coll. ZSM; **11**, **12.** *E. maculata* **11.** Female, Türkiye, Akşehir, 9.–13.v.2000, LK3931, Coll. MZH; **12.** Male, Türkiye, Akşehir, 9.–13.v.2000, Coll. MZH. Scale bars: 2 mm.

the costal margin of the wing, at the wing tip, and in two larger spots on the hind margin in the second half. In lighter specimens, the white ground colour is more prominent.

Description. Male genitalia (Figs 15, 19). The valve is slightly narrower but otherwise similar to *E. dimorphella*. The phallus is relatively broad but narrower than in *E. dimorphella*, 2/3 as long as the valva, thus longer than in *E. dimorphella*.

Female. Externally as male; genitalia unknown.

A male paralectotype examined by us, preserved in SMNK, Karlsruhe, externally fully matches the above description. In our opinion, the differences in the shapes of valvae of the lectotype (Fig. 19) and paralectotype (Fig. 15) are primarily caused by the different level of pressure on the coverslips during fixation of the preparations.

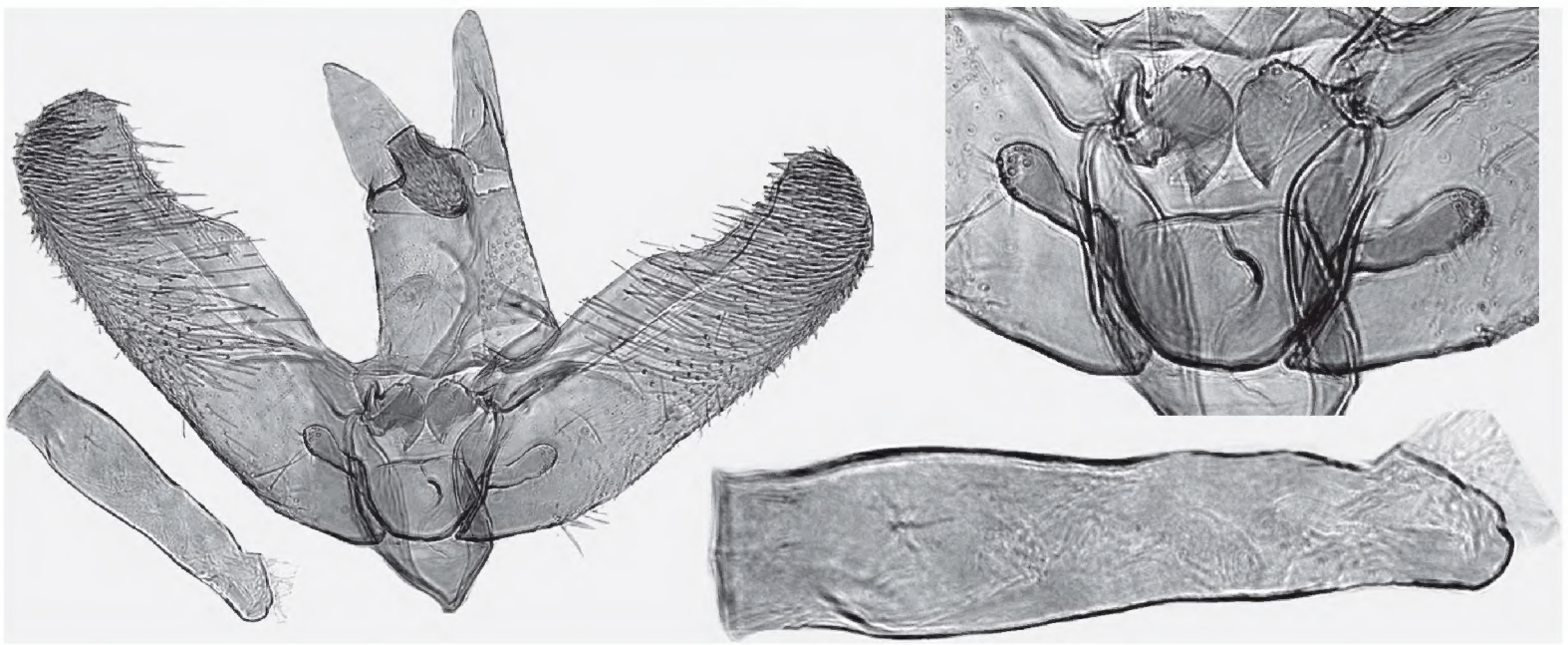


Figure 13. Male genitalia of *Elachista dimorphella* sp. nov., paratype, Croatia, Pula, 14.–19.v.1990, LK4420.

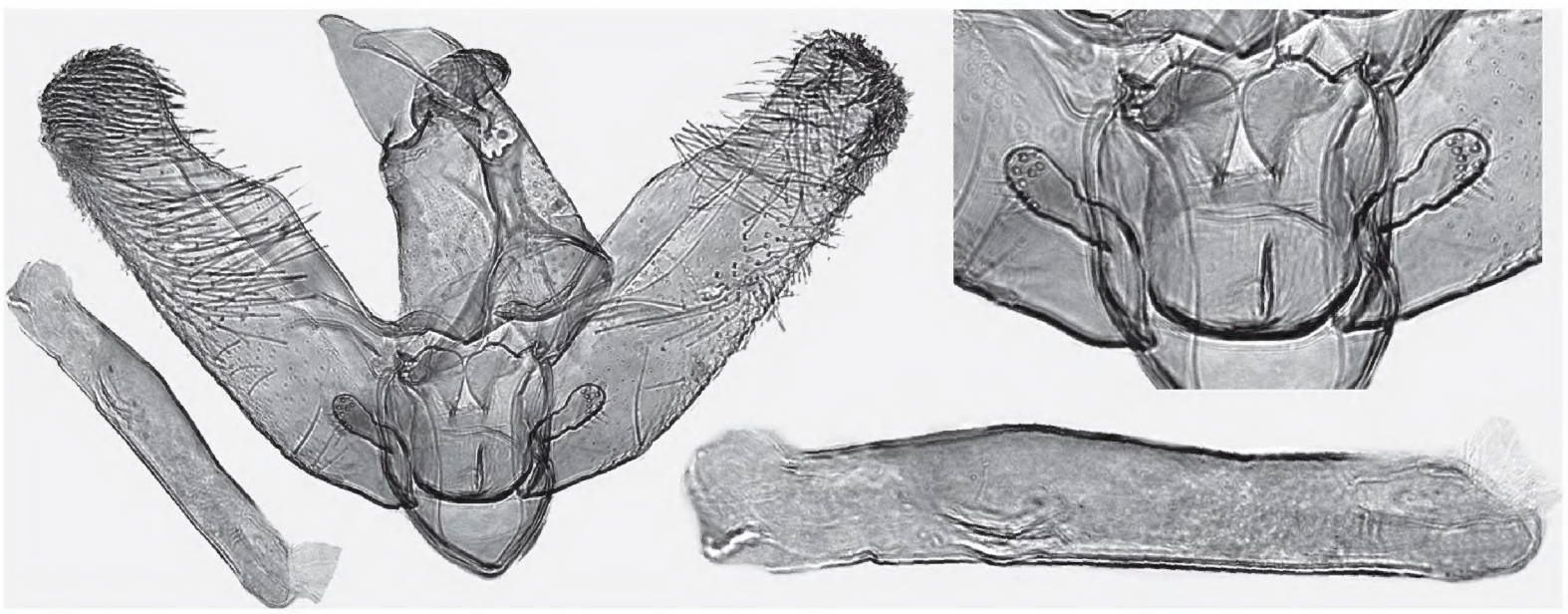


Figure 14. Male genitalia of *Elachista dimorphella* sp. nov., paratype, Croatia, Zaostrog, 9.vii.2004, LK4421.

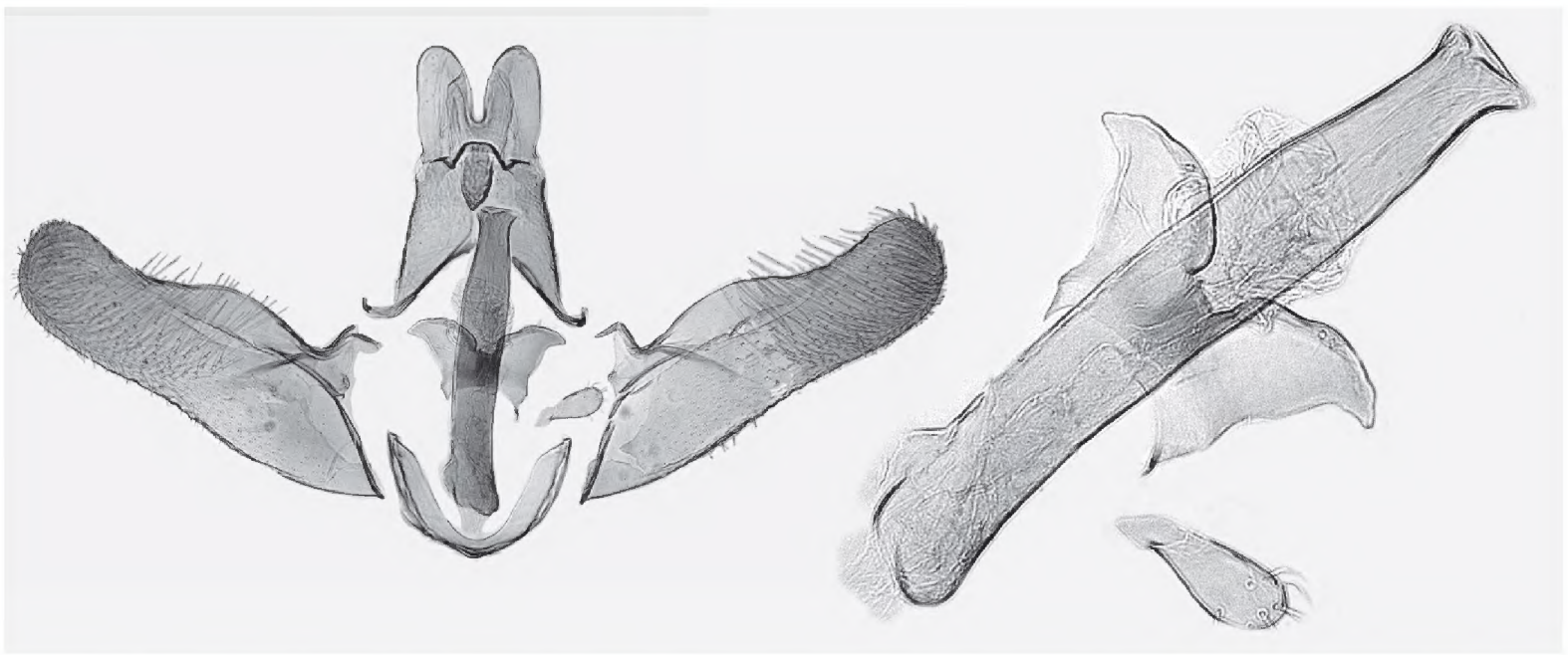


Figure 15. Male genitalia of *Elachista amseli*, paralectotype, Croatia, Dubrovnik, 15.–30. ix.1930, Prep. Gen. N°336 U. Parenti, Coll. SMNK.

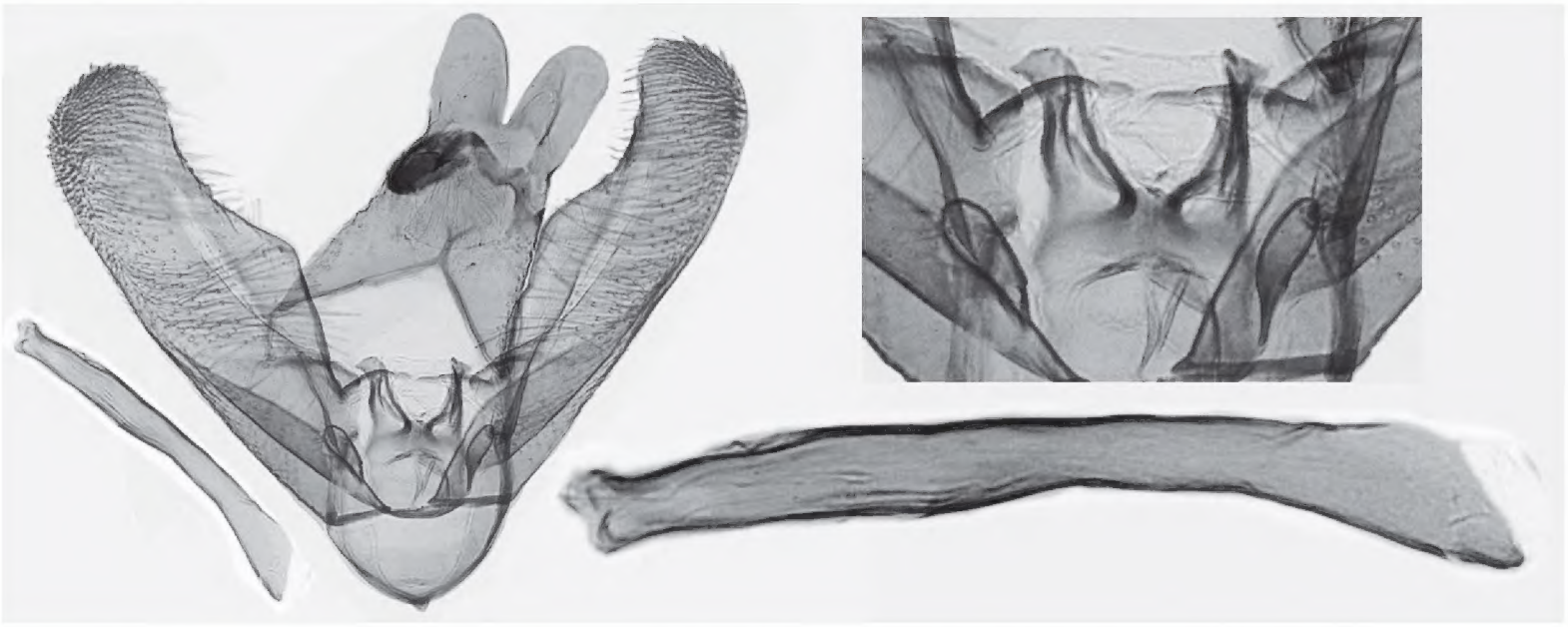


Figure 16. Male genitalia of *Elachista constitella*, Italy, Trieste, 1.v.1910, LK5751, Coll. ZSM.

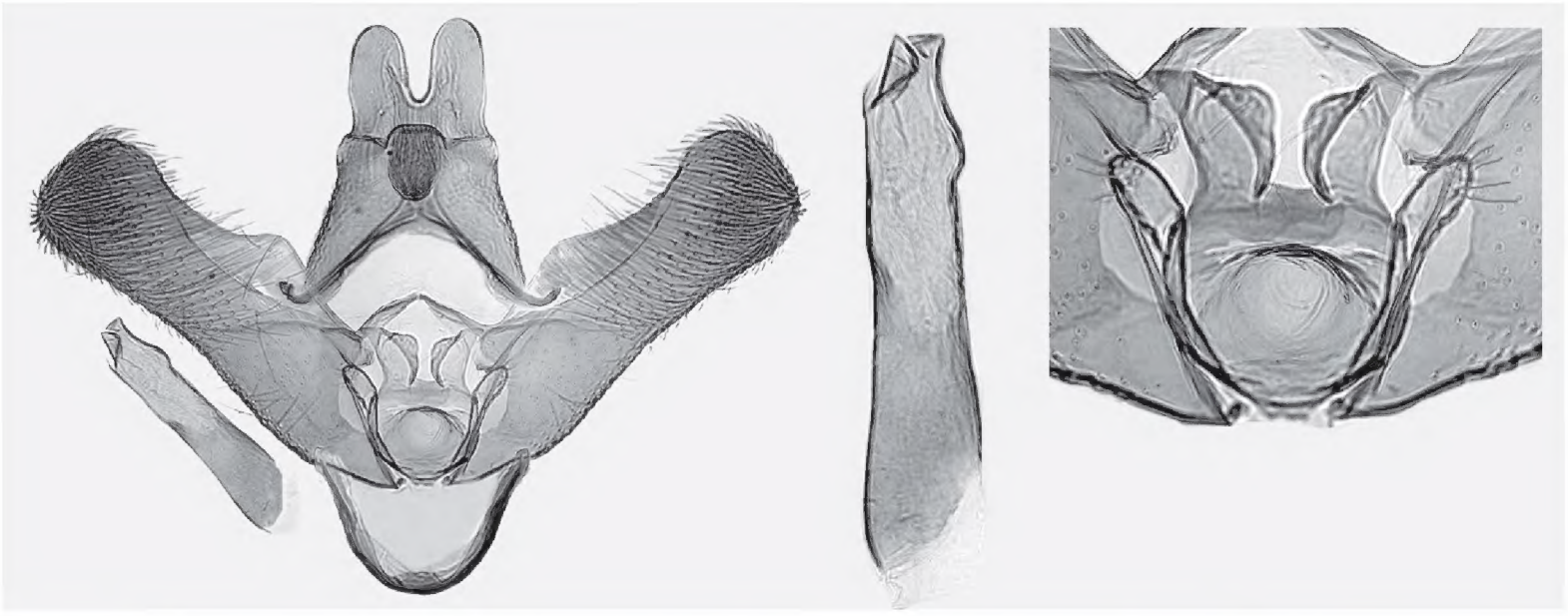


Figure 17. Male genitalia of *Elachista maculata*, holotype, Türkiye, near Konya, 27.v.1969, Prep. Gen. N°1020 U. Parenti, Coll. NHMW.

Elachista vegliae Parenti, 1978

Fig. 20

Elachista vegliae Parenti, 1978: 17

External appearance (translation from Parenti 1978). Wingspan 7–8 mm. Head whitish with scattered light brown scales. Palpi whitish. Antennae distinctly annulate, at least in the proximal third, light and dark brown. Tegulae and thorax with whitish scales at the base and light brown at the distal margin. Clusters of similar scales alternate on the forewing with groups of white scales forming irregular patterns. Fringe whitish up to the tornus, then grey. Hindwing has its fringe light grey.

Description. Male genitalia. Based on Parenti (1978), here Fig. 20. The uncus lobe is twice as long as broad in its basal part, gradually tapered to round apex. The juxta seems to differ from other species in the shape of the juxta lobes, as having broad, tongue-shaped distal lobes. Otherwise, the genitalia are similar to the other species treated here.

Female genitalia. Unknown.

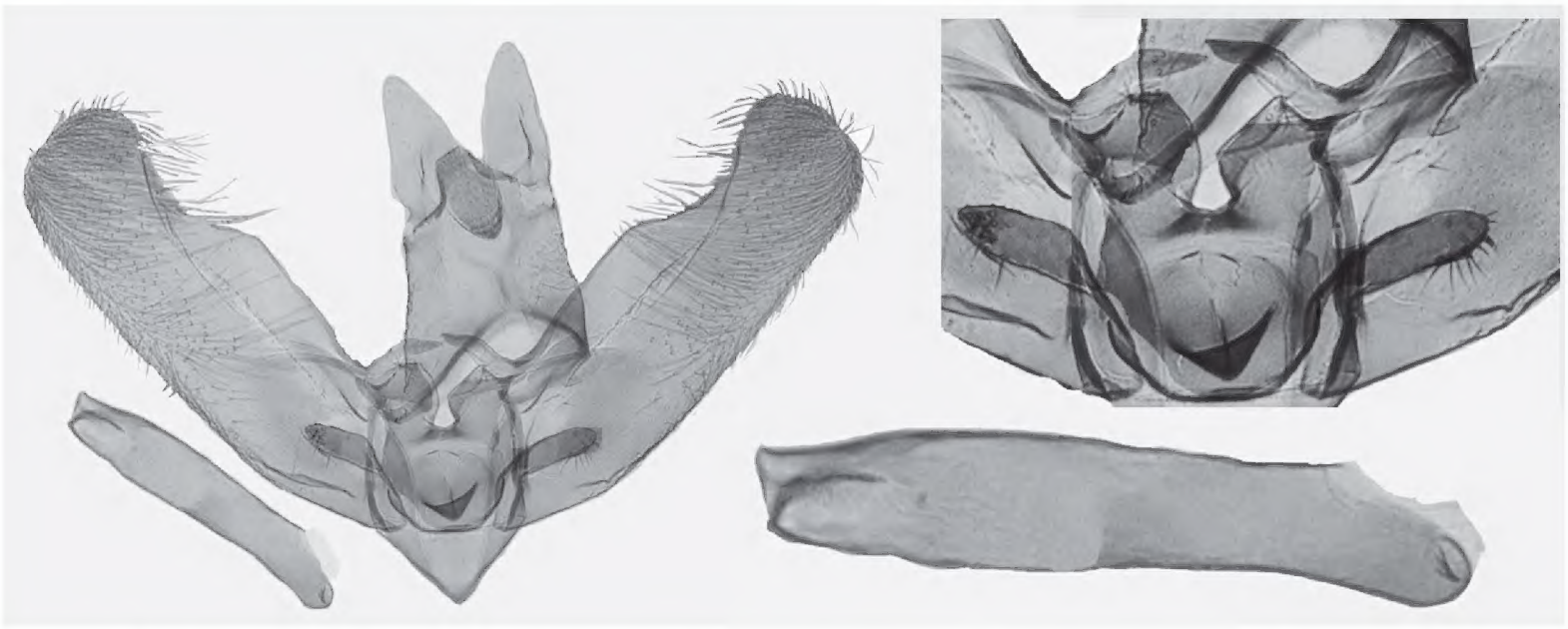
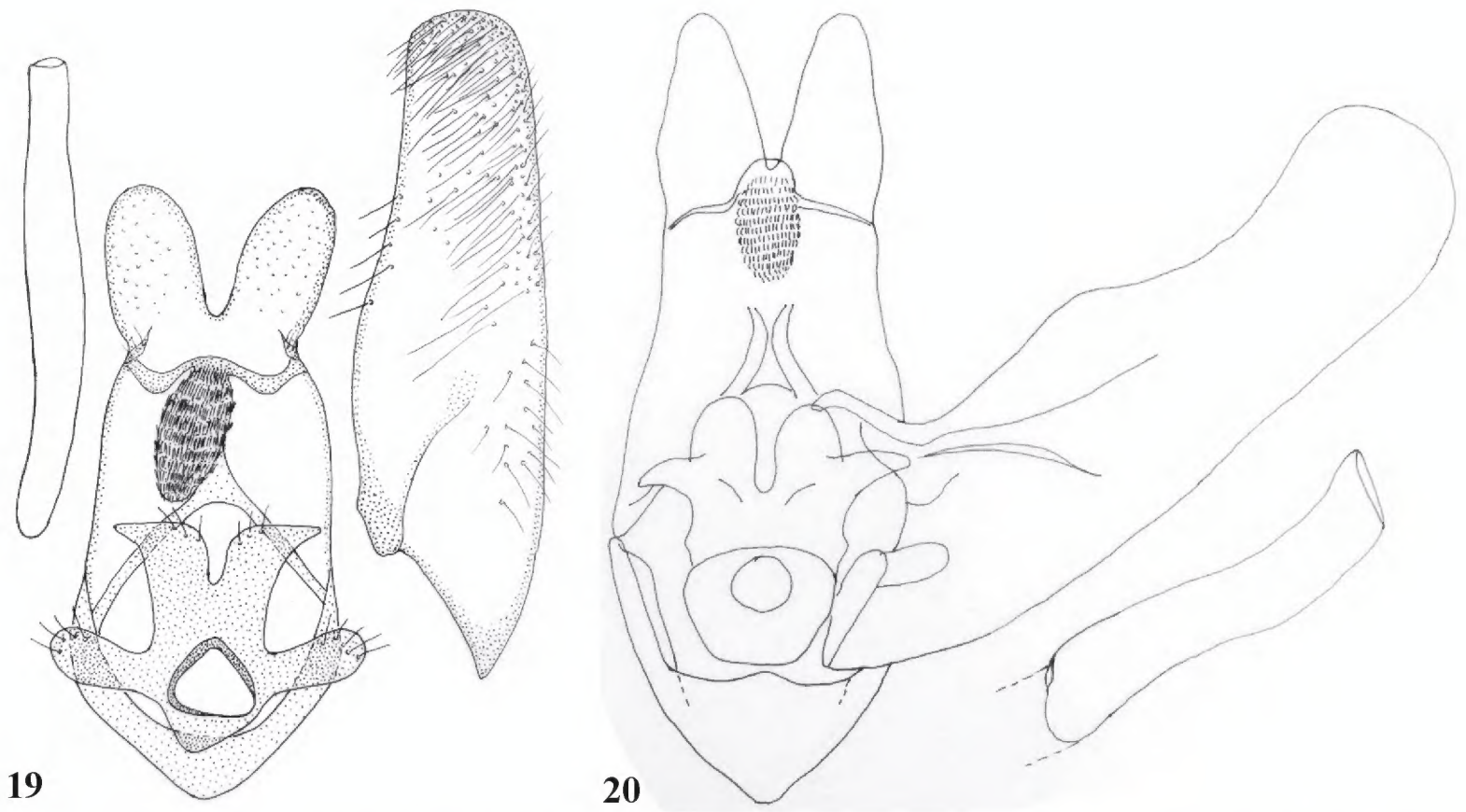


Figure 18. Male genitalia of *Elachista laurikailai*, France, Alpes-Maritimes, Col de Vence, 8.vi.2998, LK4237, Coll. MZH.



19 **20**

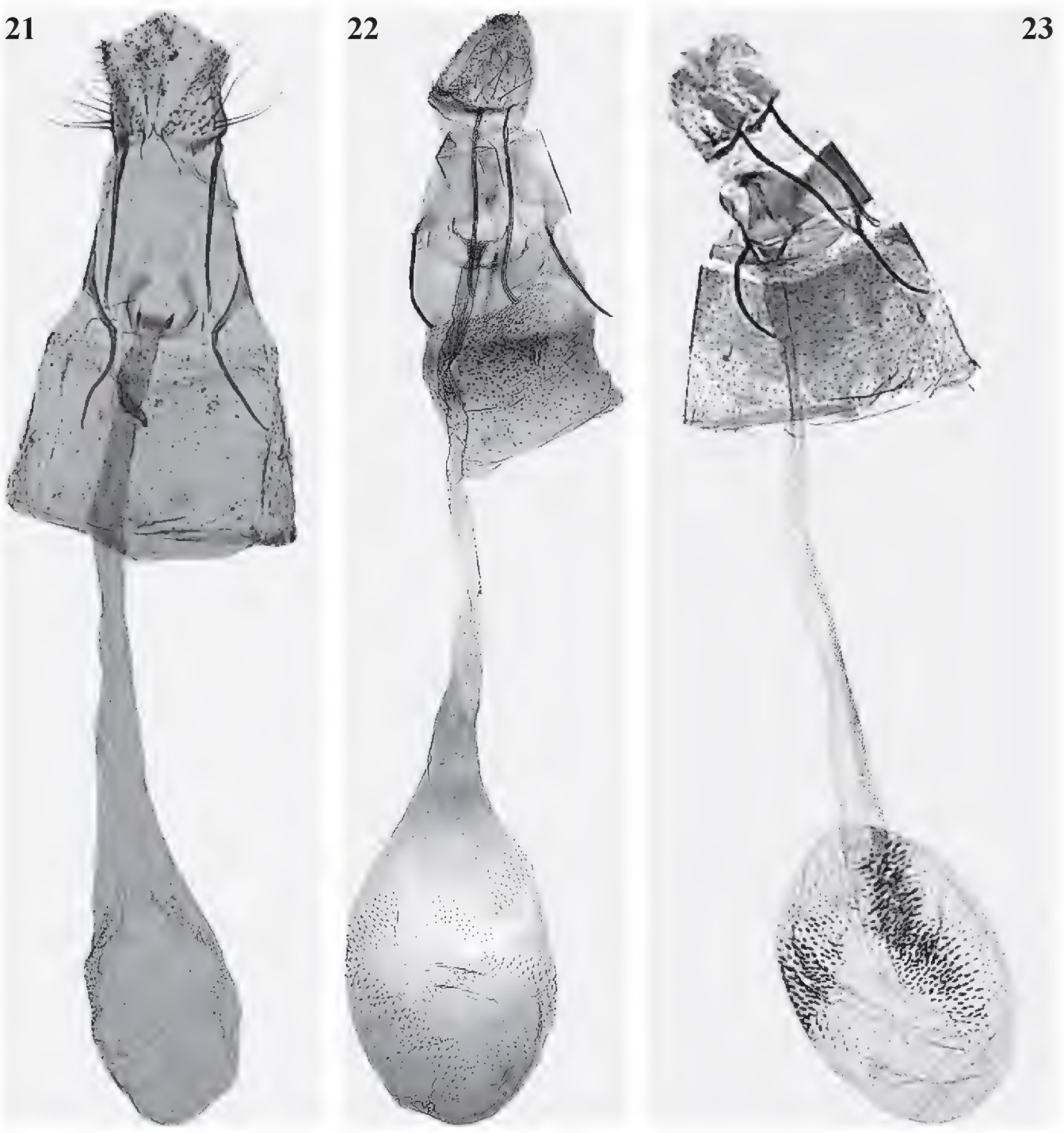
Figures 19, 20. Male genitalia. **19.** Lectotype of *Elachista amseli* (according Gaedike 1975); **20.** Holotype of *Elachista vegliae* (according Parenti 1978).

Elachista maculata Parenti, 1978

Figs 11, 12, 17, 23, 26

Elachista maculata Parenti, 1978: 15

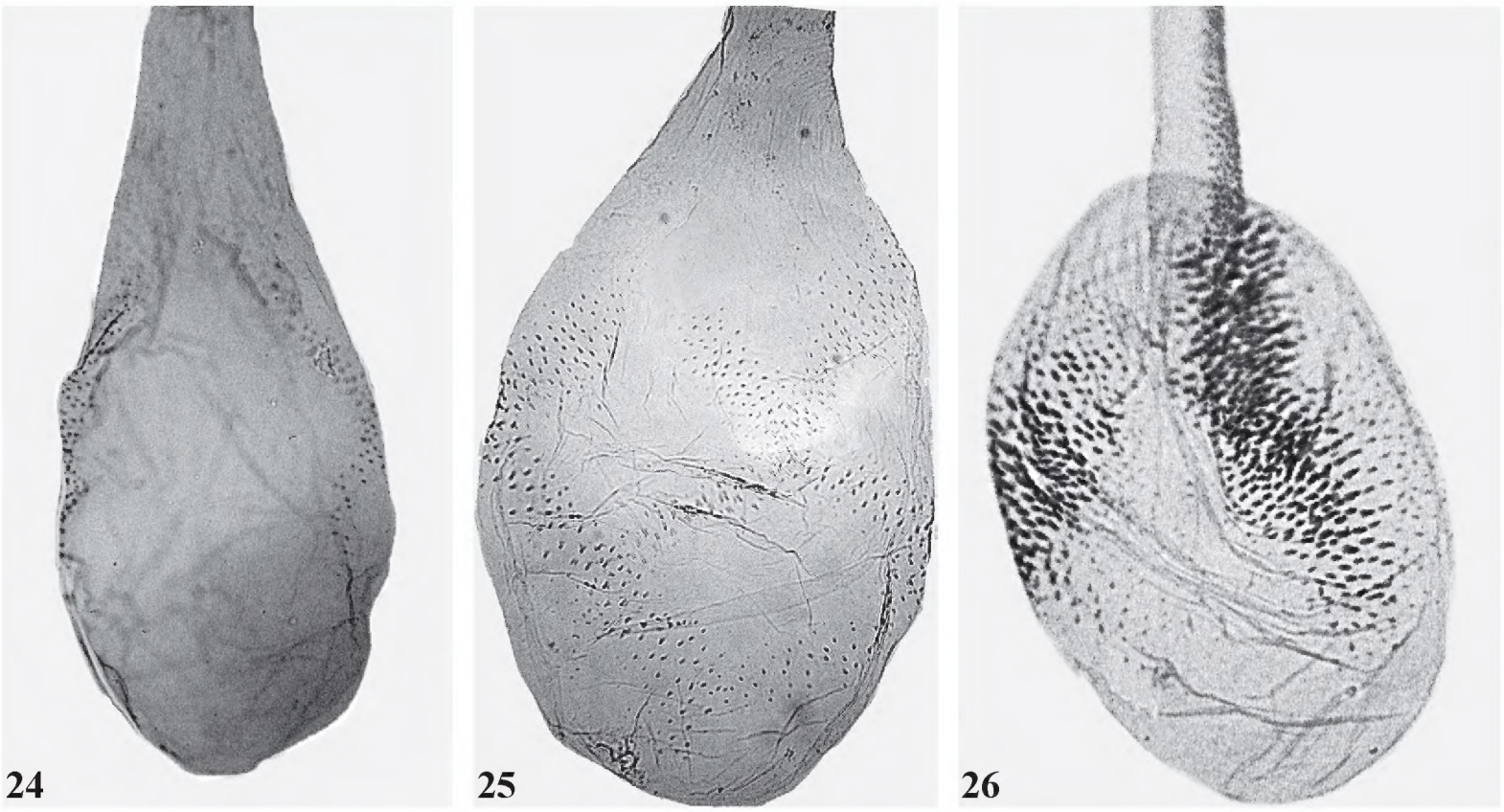
Diagnosis (Figs 11, 12). A variable species with white forewing ground colour; variably scattered with light brown and black scales that sometimes form an indistinct marking along fold in the middle of the forewing and patches along the termen.



Figures 21–23. Female genitalia of *Elachista*. **21.** *E. dimorphella* sp. nov., paratype, Croatia, Zaostrog, 8.–9. vii.2004, LK 4422; **22.** *E. constitella*, lectotype, Croatia, Rijeka, BM19403, Coll. NHMUK; **23.** *E. maculata*, Türkiye, Çetince, nr. Akşehir, 9.–13.vi.2000, locality, date, LK4758, Coll. MZH.

Description. Male genitalia (Fig. 17). The uncus lobes are twice as long as broad, distally round. The gnathos is 1.5× as long as wide. The median plate of the juxta is round with shallow, dorsally directed median sac. The juxta lobes are very small, convex, thus easily causing distortion in dissections; acute-tipped, laterally concave. The digitate process is minute, as long as the tegumen and uncus together. The valva is characteristic with the markedly convex costa, and the distally square shape. The phallus is broad, its length a little more than half of the length of the valva; somewhat swollen at distal 2/3. The apex is straight, but its shape appears variable depending whether it is fully open or not.

Female genitalia (Figs 23, 26). Papilla analis nearly round; ventrally connected with inverted Y-shaped sclerotisation. Apophysis posterioris straight, longer than the basally curved apophysis anterioris. Ostium bursae round, dorsal wall without sclerotisation or spines. Antrum and colliculum



Figures 24–26. Female genitalia of *Elachista*, corpus bursae. **24.** *E. dimorphella* sp. nov., paratype, Croatia, Zaostrog, 8.–9.vii.2004, LK 4422; **25.** *E. constitella*, lectotype, Croatia, Rijeka, BM19403, Coll. NHMUK; **26.** *E. maculata*, Türkiye, Çetince, nr. Akşehir, 9.–13.v.2000, LK4758, Coll. MZH.

Figure 27. Locality of *Elachista dimorphella* sp. nov. near Zaostrog (Croatia, Dalmatia).

indistinguishable from each other, together 2/3 as long as apophysis posterioris. Remaining part of ductus bursae approximately 3× as long as apophysis posterioris, membranous, with longitudinal row of internal spines. Ductus bursae distinctly separable from corpus bursae. Corpus bursae almost round, with two elongate patches of coarse spines.

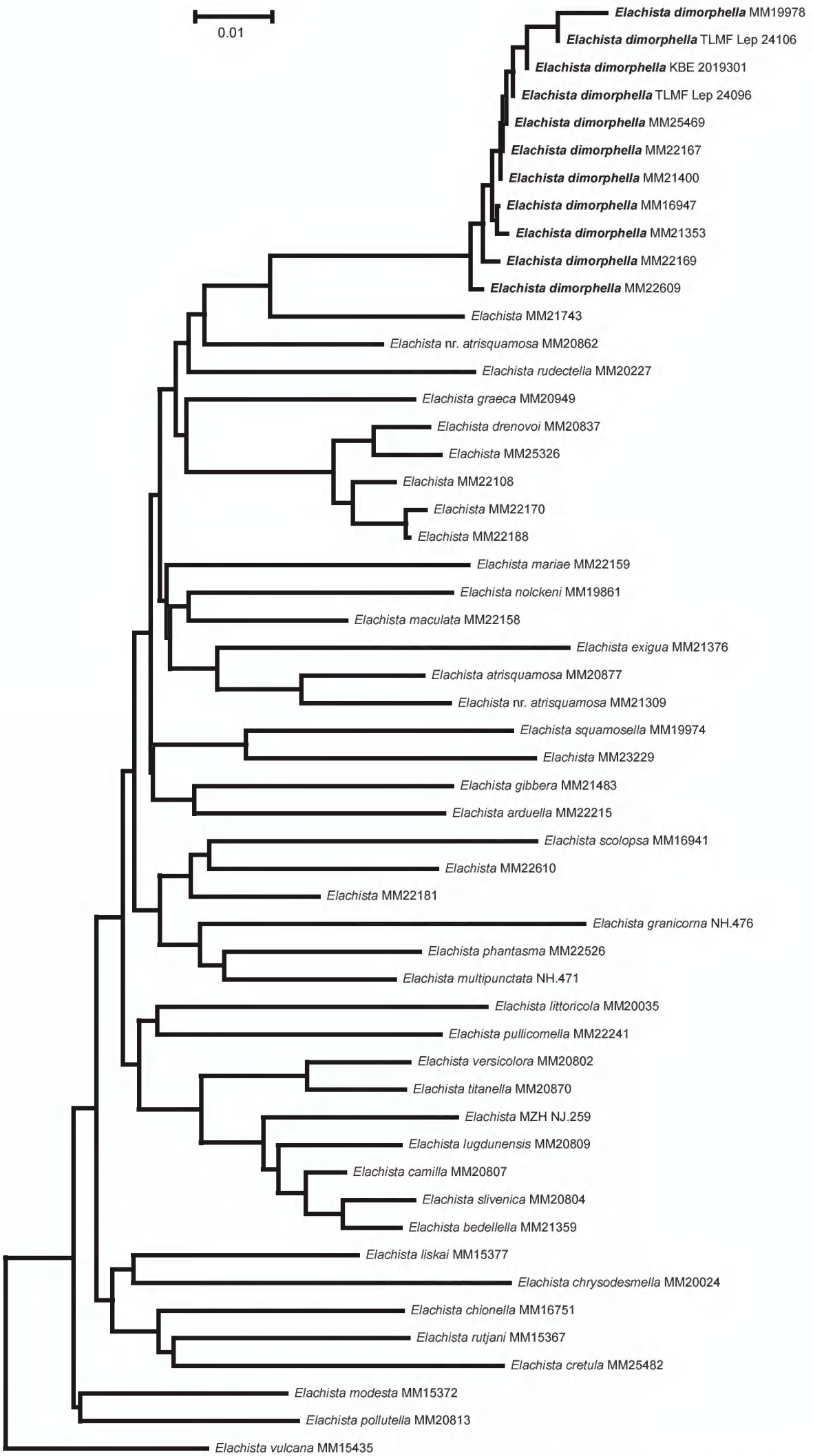


Figure 28. A Neighbor-joining tree of *Elachista dimorphella* sp. nov. (shown in bold type) and selected closely related species based on COI sequences with BOLD IDs and countries (created by M. Mutanen). Scale bar represents 2% K2P genetic divergence between sequences.

Elachista constitella Frey, 1859

Figs 9, 10, 16, 22, 25

Elachista constitella Frey, 1859: 295
E. constitella (Figs 9, 10) is externally similar to *E. maculata* (Figs 11, 12, diagnosis see above).

Description. Male genitalia (Fig. 16). Uncus lobes 2× as long as wide, distally round. Gnathos twice as long as broad. Costa of valva medially distinctly convex, sacculus basally convex, otherwise straight, indistinctly separated from cucullus, cucullus round, somewhat bent and produced towards costa. Median plate of juxta round, with shallow dorsally directed median sac; juxta lobes widely apart from each other, short [in the preparation folded so that their shape cannot be determined with certainty]; digitate process minute, half of the length of juxta lobe, elongate and narrow. Phallus 2/3× as long as valva.

Female genitalia (Figs 22, 25). Otherwise, similar to those of *E. maculata*, but papilla analis more elongate, and with several bands formed of small spines in corpus bursae.

Discussion

The taxonomy of *Elachista* is poorly known worldwide, and even the supposedly well-known areas regarding Lepidoptera in general, have repeatedly proved to be poorly known in the smaller Lepidoptera. DNA barcoding has added considerably to the understanding of the diversity in nearly all groups of Lepidoptera, in particular smaller-sized ones (for *Elachista*, see Mutanen et al. 2013). Europe, especially the Mediterranean area, is particularly poorly explored. The Balkan peninsula seems to provide extraordinary challenges regarding how the morphology of species and the DNA barcodes coincide. There is evidence that even distant barcodes with seemingly non-differentiated morphology between distant barcode clusters cause severe challenges for establishing a firm basis for a formal taxonomy (Huemer and Karsholt 2018). The same applies to many cases in *Elachista*. In the case of *E. dimorphella*, without DNA barcode it would hardly been possible to associate males and females of this species.

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